Avinashilingam Institute for Home Science and Higher Education for Women

Coimbatore- 641043

Master's Degree Examination – November 2017

Semester I

Class: I PG
Major: Biotechnology

Time: 3 Hours
Max Marks: 60

17MBTC04- Biophysical Techniques

Part – A **10 x ½ = 5**

Choose the Correct answer

1. X-ray absorption meters have which of the following major disadvantages?
   a) Low accuracy b) Low range c) Low sensitivity d) It is destructive

2. Prompt emission of X-ray by an atom ionised by a higher energy X-ray is a type of which of the following phenomena?
   a) Luminescence b) Fluorescence
   c) Phosphorescence d) Spontaneous emission

3. In an SDS-PAGE
   a) proteins are denatured by the SDS
   b) proteins have the same charge-to-mass ratio
   c) smaller proteins migrate more rapidly through the gel
   d) all of the above

4. For the separation of which of the following substances, Gas-solid chromatography is being used?
   a) Thermally stable organic component b) Volatile organic components
   c) Thermally stable inorganic component d) Low molecular weight gaseous species

5. Beer Lambert's law gives the relation between which of the following?
   a) Reflected radiation and concentration b) Scattered radiation and concentration
   c) Energy absorption and concentration d) Energy absorption and reflected radiation

6. NMR is the study of absorption of _____ by nuclei in a magnetic field.
   a) Radioactive radiation b) IR radiation c) Radio frequency radiation d) Microwaves

7. Mass spectrometers are used to determine which of the following?
   a) Composition in sample b) Concentration of elements in sample
   c) Relative mass of atoms d) Properties of sample

8. GC- MS has been developed for which of the following systems?
   a) Packed column b) Open tubular column
   c) Capillary column d) Porous layer column

9. The isotope used for the negatron is _____
   a) ^{14}C b) ^{22}Na c) ^{226}Ra d) ^{206}Pb

10. Which of the following transducers must be used for dissolved oxygen analyser?
    a) Potentiometric b) Polarographic
    c) Ion-selective electrode d) Optical ransducer

Part – B 5 X 4 = 20

Answer ALL questions

Each answer should not exceed 200 words

11.a) Explain principle and various types of Electron Microscope. **(OR)**

11.b) Describe the production and properties of X-rays.

12.a) Illustrate the principle and types of centrifuges. **(OR)**

12.b) Elaborate the applications of Agarose gel Electrophoresis.

13.a) Give applications of UV-Visible Spectroscopy. **(OR)**

13.b) Discuss on the principle and instrumentation on Atomic absorption Spectroscopy.

14.a) Write the principle and instrumentation of MALDI TOF **(OR)**

14.b) Draw the Components in Flame Photometry and mention its applications.

15.a) Sketch a polarogram and What is the unique feature of polarography which separates it from other electro analytical techniques? **(OR)**

15.b) How the radioisotopes are used in the diagnosis and treatment of diseases.

Part – C 5 X 7 = 35

Answer ALL questions

Each answer should not exceed 600 words

16.a) Explain the principle, instrumentation and sample preparation for Phase contrast microscope. **(OR)**

16.b) Write about the detection and applications of super resolution microscopy.

17.a) Which type of column- capillary or glass and which is the detector which uses only a carrier gas for detecting the eluting species in a gas chromatograph? How ?

(OR)

17.b) Explain the functioning of HPLC.

18.a)Write the principle, types of Spectra and absorbance in Fluorescence spectroscopy. **(OR)**

18.b) Describe the principle, instrumentation and applications of NMR.

19.a) Discuss on the principle, instrumentation and applications of GC-MS. **(OR)**

19.b) What is the principle of fluorimerty? Mention its instrumentation and applications.

20.a) Write an essay on Circular dichorism and Optical rotatory dispersion. **(OR)**

20.b) Describe the principle and applications of Polarography and Manometry.